

## Science Curriculum Intent

Science uses testable hypotheses to acquire, organise and revise knowledge of the natural world and this approach underpins our ambitious and challenging curriculum for science students at TEMA.

The science curriculum aims to nurture scientifically literate citizens who have the knowledge and skills to be able to formalise their curiosity into rigorous scientific methodology. This will empower all students to be active participants in global scientific discussions in the rapidly changing world of science and make critically informed decisions that will affect their futures. Students will have the opportunity to apply the scientific knowledge they have learnt by capitalising on the cross-curricular links between science and different subjects so that they are prepared to use their scientific knowledge in future careers, both in and out of science.

## Curriculum Implementation:

Using guidance from the Educational Endowment Fund ('Improving Secondary Science', 2018), the Gatsby Practical Guide and research-led pedagogical science ('Rosenshine's Principles in action', 2019) we have created a curriculum that:

- Identifies powerful knowledge and builds this knowledge sequentially with careful consideration for where this knowledge leads next
- Uses expert models to elucidate scientific concepts
- Provides opportunities for daily, weekly and monthly review
- Incorporates regular low stakes formative assessment with personalised feedback tailored to individual student and class needs
- Identifies powerful language and provides regular opportunities to apply this language to new contexts
- Supplements taught content with at least 50% practical science and demonstrations
- Explicitly links science to other academic disciplines and the wider world

		Term 1		Term 2		Term 3	
	No. of Weeks	8	7	6	6	5	7
	<b>Topic Title and NC link</b>	<b>Particles 1</b> N.C. link- The particulate nature of matter <b>Cell 1</b> N.C. link - Cells and organisation and Inheritance, chromosomes, DNA and genes	<b>Forces 1</b> N.C. link - Forces <b>Cells 2</b> N.C. link - Cells and organisation and the skeletal and muscular systems	<b>Substance 1</b> N.C. link - Physical changes, Particle model and Pure and impure substances <b>Sound 1</b> N.C. link - Sound waves and Energy and waves	<b>Space 1</b> N.C. link - Space physics <b>Particles 2</b> N.C. link - Atoms, elements and compounds, Chemical reactions and Materials	<b>Variation 1</b> N.C. link - Inheritance, chromosomes, DNA and genes <b>Electricity 1</b> N.C. link – Current electricity and Static electricity	<b>Organisms 1</b> N.C. link - Relationships in an ecosystem <b>Explore 1</b> N.C. link - Energy changes and transfers and Changes in systems
	<i>Pupils should know... (Core knowledge and concepts to be learned)</i>	<b>Concept: Fundamentals of particles</b>  Students will know the different properties of solids, liquids and gases using the particle model.  <b>Concept: Cellular basis of life, heredity and lifecycles.</b>  Students will know plant and animal cell structures and their functions. They will also know what a DNA molecule looks like and the process of inheritance in relation to their knowledge of reproduction.	<b>Concept: Fundamentals of Forces</b>  Students will know the names of different forces and understand balanced and unbalanced forces.  <b>Concept: Cellular hierarchy</b>  Students will build upon knowledge of cells to know that cells work together in tissues, organs and organ systems. Students will know how cells build the human skeletal and muscular systems.	<b>Concept: Fundamentals of particles and energy in matter</b>  Students will build on the concept of states of matter and deepen their knowledge in terms of melting, freezing and boiling points as well as pure and impure substances. Students will also know the difference between an element and a compound.  <b>Concept: Waves as sound</b>  Students will build on Particles 1 and know that sounds waves are when energy is transferred between particles.	<b>Concept: Fundamentals of Space in our solar system</b>  Students will know about our solar system, our galaxy and other galaxies. Students will also begin to understand gravity in the context of Space.  <b>Concept: Atoms, elements, compounds and their properties.</b>  Students will build on Particles 1 to know that all matter is made of particles called atoms and that the arrangement of atoms and gives rise to the properties of substances.	<b>Concept: Inheritance and variation</b>  Students should know that there is great diversity of organisms, living and extinct, with many similarities and differences between them. Differences between organisms cause species to evolve by natural selection of individuals.  <b>Concept: Current and static electricity</b>  Students will know about transfer of energy from a power source through a circuit to components as well as electrostatic forces in terms of static electricity.	<b>Concept: Relationships in an ecosystem.</b>  Pupils develop an understanding that all organisms, including humans, depend on, interact with and affect the environments in which they live and other organisms that live there.  <b>Concept: Energy changes and transfers.</b>  Explore 1 focuses on the Big Idea of Forces and motion. Pupils will begin to develop their understanding of energy. There are different types of energy which can be stored and transferred. N.C.- Students will need to understand power and how to calculate it as well as linking energy to food.
<b>Year 7</b>	<i>Pupils should be able to do... (Skills being developed)</i>	Pupils will be introduced to lab safety and conducting risk assessments as well as using appropriate equipment and techniques to conduct and record various measurements.  <b>KS3 Skills: 1c, 2b, 2d and 2e, 4a.</b>  In Cells 1, students will develop skills in drawing scientific diagrams of cells as well as some understanding of scale. Students will also develop practical skills of using microscopes, preparing slides and observing cells.  <b>KS3 Skills: 2d, 2e.</b>	Pupils will develop their numeracy skills during Forces 1 by developing an understanding of reading scales on newton meters and using rulers to draw force arrows to scale. They will also create hypotheses and approve/ disprove their hypotheses using data collected during experiments such as investigating friction.  <b>KS3 Skills: 2b, 2c, 2d, 2e, 4a.</b>  In Cells 2, students will develop skills in their understanding of scale.  <b>KS3 Skills:</b>	In Substance 1, students develop skills such as reading and plotting graphs and using diagrams to represent and explain a model. Students will begin to develop practical skills such as measuring time, temperature, mass and volume. Students will also begin to create risk assessments for practical activities.  <b>KS3 Skills: 1c, 2b, 2c, 2d, 2e, 3b, 4a.</b>  Pupils will develop their numeracy skills during Sound 1 through calculation of the speed of sound which may stretch to rearranging the subject of the equation. This skill transfers across all	Space 1 will enable students to further develop their idea of scale. Students will also begin to use models to explain their scientific knowledge of our solar system.  <b>KS3 Skills: 1b, 2a, 3c, 3d, 4a.</b>  Particles 2 will develop working scientifically by getting pupils to make observations and write scientific explanations to explain this observation.  <b>KS3 Skills: 3d, 3e, 3f, 4a.</b>	In Variation1 pupils will work scientifically by classifying organisms into groups, graphically plot data to identify continuous and discontinuous variation.  <b>KS3 Skills: 3c</b>  In Circuits 1 pupils will develop their understanding of how to draw circuits using symbols, write scientific sentences to explain concepts as well as read decimals off scientific equipment to investigate how the number of bulbs affects bulb brightness in a series circuit.  <b>KS3 Skills: 1a, 1c, 2a, 2d, 2e, 3d, 4a.</b>	In Organisms 1, students will understand how sampling techniques can be used to evaluate populations in ecosystems and link this to explanations of how organisms interact in an environment.  <b>KS3 Skills: 2f, 3c, 3d.</b>  Students will begin to use and understand relevant SI units. Pupils will develop their literacy skills by using the reciprocal method to understand how to summarise scientific journals that link to the topic.  <b>KS3 Skills: 2a, 2b, 2c, 2d, 2e, 3a, 3b, 3c, 3d, 4a, 4b.</b>

				years as application and manipulation is present in at least one unit. Sound 1 will also interpret oscilloscope traces by identifying patterns on graphs.  <b>KS3 Skills: 3a, 3c, 4a, 4b.</b>			
<i>Why are we doing this now? How does it build on prior learning and prepare for knowledge and learning still to come?</i>	<p>Particles 1 consolidates knowledge from KS2 about solids, liquids and gases. This enables understanding of speed of sounds in different materials in Sound 1 (Year 7) and further study of separating solutions in Substance 2 (Year 8). This knowledge will go on to form foundational knowledge at KS4 specifically for the Particle model in Physics.</p> <p>Cells and cellular structures are not introduced until KS3. Cells 1 becomes the first instance in which many students will learn about cells. The basic features and functions of cells underpin most topics in Biology. This unit also builds on a secure knowledge many students already have of reproduction and at KS3 we link this to DNA and inheritance. Students will build on this knowledge in Cells 2, Variation 1, Organisms 1 (Year 7), Cells 3, Variation 2, Heredity 1 (Year 8), Variation 3 and Health 2 (Year 9).</p>	<p>Forces 1 builds on KS2 forces and prepares students for Explore 1 (Year 7), Forces 2 (Year 8), Forces 3 (Year 9) and KS4 Forces.</p> <p>Cells 2 builds on the previous unit of Cells 1. This will then prepare students for Cells 3 which involves the human circulatory system, digestive, gas exchange and plant systems. All of which are topics studied at KS4 in Organisation.</p>	<p>Substances 1 builds on knowledge from Particles 1 where students will have compared solids, liquids and gases and will be familiar with some common examples of each. This knowledge will be consolidated in Particles 2 (Year 7) and will go on to form foundational knowledge at KS4 specifically for the Particle model in Physics.</p> <p>Sound 1 builds on KS2 ideas about sound and consolidates understanding of the particle model (Substance 1). It also links to Light 1 (Year 8) and KS4 Waves.</p>	<p>Space 1 consolidates on KS2 knowledge of the Earth's movement around the Sun and its rotation to cause day and night. This is further developed in Earth 1 (Year 8) where students learn more about days and seasons (in northern and southern hemispheres). Working scientifically: students understand scientific theories develop as new evidence modifies previous ideas (comparing old ideas about the solar system and space).</p> <p>Particles 2 is a foundational unit for chemistry and physics and links to previous unit, Particles 1. This unit links to Reactions 1 and 2 (Year 9) as the concepts taught underpin conservation of mass. This later develops in Year 9 with the introduction of the atomic model and density as well as linking to GCSE when pupils are expected to understand more complex reactions.</p>	<p>Variation 1 builds on KS2 where pupils had to describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences and that offspring vary and are not identical. Variation 1 then builds on Cells 1 (Year 7) and links to Heredity 1 (Year 8), Variation 3 (Year 9) and Ecology and Genetic units at KS4.</p> <p>Electricity 1 builds on KS2 understanding of how to build and draw circuits, Forces 2 (Year 7), Electricity 2 (Year 8) and Magnets 1 (Year 9) when pupils study electromagnets. It then links to KS4 Electricity.</p>	<p>Organisms 1 builds on KS2 where pupils had to identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat (Year 3) and construct and interpret a variety of food chains, identifying producers, predators and prey (Year 4). It then builds on Forces 1 (Year 7), Explore (Year 7), Organisms 2 (Year 9) and Ecology and Bioenergetics at KS4.</p> <p>This unit also links to <b>Weather and Ecosystems</b> in Geography studied in Year 7.</p> <p>The topic of Energy is first encountered in KS3 in Explore 1 (although it is mentioned briefly in food chains in Organisms 1 and Electricity 1). This is then built upon in Reactions 3 and Matter 1 in Year 8 then Waves 1 in Year 9. Energy forms foundational knowledge for Physics throughout multiple topics and Chemistry with reference to chemical reactions.</p>	

	<p><i>Topic title and NC Links</i></p>	<p><b>Reactions 1</b> N.C. link - Chemical reactions <b>Cells 3</b> N.C. link - Nutrition and digestion, Gas exchange systems and Cellular respiration</p>	<p><b>Light 1</b> N.C. link - Light waves <b>Earth 1</b> N.C. link - Space physics and Earth and atmosphere</p>	<p><b>Reactions 2</b> N.C. link - Energetics <b>Health 1</b> N.C. link - Nutrition and digestion</p>	<p><b>Electricity 2</b> N.C. link - Current electricity <b>Variation 2</b> N.C. link - - Inheritance, chromosomes, DNA and genes</p>	<p><b>Forces 2</b> N.C. link – Balanced forces, Describing motion and Forces and motion. <b>Substances 2</b> N.C. link - Pure and impure substances and Chemical reactions</p>	<p><b>Heredity 1</b> N.C. link - Inheritance, chromosomes, DNA and genes and Reproduction <b>Matter 1</b> N.C. link -</p>
	<p><i>Pupils should know...</i>  <i>(Core knowledge and concepts to be learned)</i></p>	<p><b>Concept: Chemical reactions</b>  Students will learn how new substances are formed during chemical reactions, how atoms are rearranged and how to represent chemical reactions accurately.  <b>Concept: Cellular respiration and exchange systems</b>  Students develop the understanding of the importance of the different animal systems to supply our cells. They will be introduced to the processes of respiration and photosynthesis.</p>	<p><b>Concept: Fundamentals of Light</b>  Pupils will learn through practical exploration that light travels in straight lines and that light can be transmitted, reflected or absorbed. Pupils will be introduced to how we see light and how white light is actually made of different wavelengths of colour.  <b>Concept: Earth Structure and Chemistry</b>  Students will continue to develop their knowledge of day and night on Earth as well as the reasons for different seasons in the northern and southern hemispheres. Earth 1 also introduces the topic of Air Quality and The Water Cycle on Earth.</p>	<p><b>Concept: Energetics in reactions</b>  Reactions 2 builds on the Big Idea of Chemical Reactions. Students will learn about combustion, conservation of mass and energy changes in reactions.  <b>Concept: Nutrition and digestion</b>  Students will learn the difference between 'good' and 'ill' health and disease. They will also further develop understanding of what a healthy diet is and the importance of exercise.</p>	<p><b>Concept: Electrical energy</b>  By studying Electricity 2 students will learn about transfer of energy from a power source through a circuit to components such as light bulbs, motors and buzzers and they will develop an understanding of electrical resistance through investigation.  <b>Concept: Variation in ecosystems.</b>  Variation 1 will ensure that pupils develop an understanding of Big Idea Variation, adaptation and evolution that there is a great diversity of organisms, living and extinct, with many similarities and differences between them. Differences between organisms cause species to evolve by natural selection of individuals.</p>	<p><b>Concept: Describing motion</b>  Students will build on Forces 1 to understand how balanced and unbalanced forces can link to speed and motion of objects.  <b>Concept: Pure and impure substances</b>  Students will define pure and impure substances and apply this to separation techniques. Students will also learn about reactions in solutions.</p>	<p><b>Concept: Inheritance, DNA, chromosomes and genes.</b>  By studying Heredity 1 pupils will know that each generation of organisms inherits characteristics from the one before, which arise from genetic information stored in the DNA of the genome and are affected by the environment.  <b>Concept: Energy in matter</b>  Matter 1 (Big Idea: Matter) builds on the understanding of energy in specific reference to heat and temperature. Students will learn the difference between heat and temperature and the phenomena of thermal conduction and convection in different contexts.</p>
<p><b>Year 8</b></p>	<p><i>Pupils should be able to do...</i>  <i>(Skills being developed)</i></p>	<p>Students will learn working scientifically skills such as evaluating risks, make and recording observations and measurements during an investigation and to explain data in relation to predictions or hypotheses.  <b>KS3 Skills: 2b, 2c, 2d, 2e, 3b, 3c, 3d, 4a.</b></p>	<p>In Light 1 pupils will measure angles using protractors and learn how to create scientific diagrams to represent light rays.  <b>KS3 Skills: 2d, 2e.</b>  Earth 1 will allow students to evaluate a range of data.  <b>KS3 Skills: 3b, 3c, 3d, 3e, 3f.</b></p>	<p>Students will develop their practical skills in planning and carrying out appropriate scientific enquiries using correct equipment when investigating exothermic and endothermic reactions.  <b>KS3 Skills: 1c, 2a, 2b, 2c, 2d, 2e, 3a, 3b, 3c, 4a.</b>  Students will develop their working scientifically skills in interpreting data, identifying patterns and drawing conclusions from numerical information based around disease, diet and exercise. Students will also develop their skills of simple</p>	<p>In Electricity 2, pupils will consolidate on their understanding of decimals to read scientific equipment and record their data in tables. Stretch tasks will ensure that students can calculate resistance using the RUULES.  <b>KS3 Skills: 3a, 3b, 3c, 3d, 3e, 4a, 4b.</b>  In Variation 2, pupils will classify organisms based on characteristics and be able to create a timeline to scale of the Earth's history. Pupils will develop their literacy skills to describe processes with the powerful language for the unit</p>	<p>In Forces 2 pupils will develop numeracy skills to plot data on graphs, read graphs and identify patterns in data on graphs.  <b>KS3 Skills: 2b, 2c, 2d, 2e, 3b, 3c.</b>  In Substances 2 pupils will develop the skill of reading data from tables as well as understanding how to read a chromatogram.  <b>KS3 Skills: 3b, 3c.</b></p>	<p>Heredity 1  <b>KS3 Skills: 2a</b>  Matter 1  <b>KS3 Skills: 1c, 2a, 2b, 2c, 2d, 2e, 3c, 3d, 4a.</b></p>

				calculations of energy requirements in a healthy diet.	<b>KS3 Skills: 1b, 2a.</b>		
			<b>KS3 Skills: 3a, 3c, 4a, 4b.</b>	Students have previously learnt about energy changes in Explore 1. This topic consolidates ideas about energy conservation and energy transfers. Exothermic and endothermic reactions are further investigated in KS4 Chemistry.	Electricity 2 builds from the Electricity 1 (Year 7) where pupils will have a good understanding of how to construct simple circuits, defining and measuring current and potential difference which will be built upon further in GCSE physics.	Forces 2 builds on KS2 forces and on Forces 1 (Year 7). This builds onto Forces 3 (Year 9), Magnetism (Year 9) and Explore 2 (Year 9). This will provide the building blocks for GCSE Forces and Energy.	Heredity 1 builds on Cells 1 (Year 7) which introduced genetic information to help introduce the concept that when multicellular organisms grow, they do so by making new cells from existing cells through cell divisions. Heredity 1 introduces growth and development and reproduction and then incorporates photosynthesis when describing plant growth. Heredity 1 leads onto Variation 3 (Year 9) and then onto Inheritance, Bioenergetics and Ecology at GCSE,
		Cells 3 builds on KS2 knowledge of the functions of the skeleton, muscles, circulatory system and digestive system. The circulatory and digestive system are studied further in KS4 Biology in Organization.	Light 1 build on KS2 when pupils learnt key terms linked to light and pupils can then compare light waves to sound (Sound 1 Year 7). Pupils will build on the work they did on light in Space 1 (Year 7) and then link it to Light 2 (Year 9) when applying to lenses and refraction. At GCSE pupils will then understand the EM spectrum.  Students will have some knowledge of day and night from KS2 which is further consolidated in Space 1 in Year 7. Earth 1 builds further on this to explain seasons of the year in northern and southern hemispheres.	Health 1 builds on KS2 knowledge of the importance of a healthy diet and exercise and consequences of an unhealthy diet and little exercise. Health 1 leads onto Health 2 in Year 9 where disease is developed further into the explanation of pathogens and disease. At KS4, students will study health and disease in the topic of Infection and Response.	Variation 2 builds upon Variation 1 (Year 7) as pupils must identify differences between species to classify differences between species. It incorporates physical and chemical weathering. Variation 2 leads onto Heredity 2 (Year 8) and Variation 3 (Year 9) which will provide the foundations for KS4 inheritance.	Substance 2 builds on the work that pupils have studied in Particles 1 and 2 (Year 7). They will have a basic knowledge of scientific equipment and some practical skills from Substance 1. This unit builds on Matter 1 and 2 (Year 7) and the topic leads onto Substance 3 (Year 9) where pupils will learn about the pH scale and neutralisation. Substance 2 will provide a basis of understanding for key terms such as solution, solvent which will link to students' ideas about concentration. This will link to GCSE level and provide the foundations for developing practical skills.	Matter 1 which will introduce knowledge on the the difference between heat and temperature and the phenomena of thermal conduction and convection in different contexts This will develop scientific skills by presenting reasoned explanations, to explain data, to predictions and hypotheses. This will build on knowledge of <b>Particles 1</b> and <b>Explore 1</b> from Year 7 and make links to <b>Volcanoes and Earthquakes</b> studied in Year 8 Geography.
	<i>Why are we doing this now? How does this build on prior knowledge and the knowledge still to come?</i>						

Year 9	<p><i>Topic title</i></p>	<p><b>Light 2</b> N.C. link - Light waves <b>Variation 3</b> N.C. link - Inheritance, chromosomes, DNA and genes</p>	<p><b>Substance 3</b> N.C. link - Chemical reactions <b>Earth 2</b> N.C. link - Earth and atmosphere</p>	<p><b>Waves 1</b> N.C. link - Sound waves and Energy and waves <b>Health 2</b> N.C. link – Cells and organisation and Reproduction</p>	<p><b>Forces 3</b> N.C. link - Forces <b>Magnetism 1</b> N.C. link - Magnetism</p>	<p><b>Explore 2</b> N.C. link - Pressure in fluids <b>Particles 3</b> N.C. link - Atoms, elements and compounds and the periodic table</p>	<p><b>Organisms 2</b> N.C. link - Inheritance, chromosomes, DNA and genes <b>Explore 3</b> N.C. link - Materials</p>
	<p><i>Pupils should know...</i> <i>(Core knowledge and concepts to be learned)</i></p>	<p><b>Concept: Light waves</b></p> <p>Students will develop their idea of the model of light rays to explain images. Only some light rays from each point of an illuminated object can pass through a pinhole, hitting a screen at distinct points to make an inverted image. All light from each point of an object that passes through a converging lens is bent (refracted) to a corresponding point in a sharp image.</p> <p><b>Concept: Evolution</b></p> <p>Students will learn characteristics of a species can change over generations as advantageous adaptations become more common; this is evolution, and can be explained by a process of natural selection.</p>	<p><b>Concept: pH scale and it's applications</b></p> <p>Students will learn that acidic and alkaline solutions may be compared using the pH scale. A salt is formed from a neutralisation reaction between an acid and a base.</p> <p><b>Concept: Earth's atmosphere and Weathering</b></p> <p>Chemical reactions between pollutants and water in the atmosphere may cause a difference in pH of rainwater leading to chemical weathering of rocks. Solid rock can be physically broken up into smaller pieces and moved to new locations by a range of natural processes, which over time can transform a landscape.</p>	<p><b>Concept: Energy and Waves</b></p> <p>As a sound wave (longitudinal wave) travels it transfers energy, as particles of the medium through which it travels are successively made to vibrate forwards and backwards along the direction in which the wave travels. A transverse wave travelling across the surface of water (or along a rope) transfers energy, as particles of water (or rope) are successively made to vibrate at right angles to the direction in which the wave travels.</p> <p><b>Concept: Health and Reproduction</b></p> <p>The health of organisms can be affected by infection with pathogens. The human reproductive systems produce and release gametes which come together during sexual reproduction, and if an ovum is fertilised by a sperm a foetus develops in the uterus of the female. Contraceptive methods can prevent transmission of sexually transmitted infections and unwanted pregnancies. Flowering plants can reproduce asexually (by producing bulbs, tubers or runners) or sexually (by producing gametes, which come together during pollination and fertilisation, followed by the development of seeds).</p>	<p><b>Concept: Forces and motion</b></p> <p>Mass is a measure of the amount of matter an object or substance is comprised of and weight is the force needed to support the object or substance. An object resting on the floor squashes it a little and, because at a microscopic level the floor is springy, it pushes back on the object with an equal sized force in the opposite direction to the object's weight. If a force acts on a pivoted object, the object turns about its pivot: the size of the turning effect depends on the size of the force and on its (perpendicular) distance from the pivot.</p> <p><b>Concept: Fundamentals of magnetism</b></p> <p>By studying Magnets 1 pupils will develop an understanding that the everyday world is largely a consequence of electrical charge. Also, that understanding electricity and magnetism helps us develop technology to improve lives.</p> <p>The magnetic field around a magnet can be represented by field lines, which indicate the size and direction of the force of the magnet on the north-seeking-pole of another magnet. Moving electric charge creates a magnetic field; and current around a coil of wire makes a magnet that is like a bar magnet, which can be turned on and off.</p>	<p><b>Concept: Adaptations in extreme environments.</b></p> <p>By studying Explore 2 pupils will understand why humans struggle to survive in different inhospitable environments (due to pressure and temperature) and appreciate how some organisms are suitably adapted.</p> <p>An object that is surrounded by a fluid (liquid and/or gas) floats if its overall density is less than the density of the fluid. Pressure increases with depth in a fluid, so the force exerted by a fluid is larger on the lower surface of an immersed object than on the upper surface. This results in an upward force on the object.</p> <p><b>Concept: Model of the Atom and the Periodic table.</b></p> <p>The structure of an atom may be represented by an atomic model. When sequenced by atomic number, elements with similar chemical properties recur at periodic intervals. Trends in physical properties of the elements can be used to predict properties of unfamiliar elements.</p>	<p><b>Concept: Variation and Biodiversity</b></p> <p>The environmental conditions in different ecosystems, and in different parts of an ecosystem, affect and are affected by the organisms that live there. The Earth's biodiversity is important, but is continually threatened by human activities; humans can protect biodiversity through conservation and sustainable use of resources.</p> <p><b>Concept: The rock cycle and materials</b></p> <p>Sedimentary rock forms when buried sediments are compacted and minerals dissolved in water move out of solution to cement the sediments together. Properties can be used to classify types of material as metals, ceramics or polymers. Different materials can sometimes be combined to produce a composite, which has properties in common with each material from which it is made.</p>

<p><i>Pupils should be able to do...</i> <i>(Skills being developed)</i></p>	<p><b>Light 2</b> <b>KS3 Skills: 2c, 2d,2e,3b,3c,3d,3e, 3f, 4a.</b></p> <p>Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate.</p> <p>Present reasoned explanations, including explaining data in relation to predictions and hypotheses.</p> <p>Evaluate data, showing awareness of potential sources of random and systematic error.</p> <p><b>Variation 3</b> <b>KS3 Skills: 1b, 2a.</b></p> <p>Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</p>	<p><b>Substance 3</b> <b>KS3 Skills: 1a, 1c, 2c, 2d, 2e 2f, 3e, 4a.</b></p> <p>Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.</p> <p>Apply sampling techniques.</p> <p><b>Earth 2</b> <b>KS3 Skills: 3b, 3c, 3d.</b></p> <p>Present observations and data using appropriate methods, including tables and graphs.</p> <p>Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions.</p>	<p><b>Waves 1</b> <b>KS3 Skills: 2a, 2b, 2c, 2d, 2e, 3a,3c,3d,3e,3f, 4a,4b, 4c.</b></p> <p>Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature.</p> <p>Use and derive simple equations and carry out appropriate calculations.</p> <p><b>Health 2</b> <b>KS3 Skills: 2f, 3c, 3e,3f</b></p> <p>Evaluate data, showing awareness of potential sources of random and systematic error.</p> <p>Identify further questions arising from their results.</p>	<p><b>Forces 3</b> <b>KS3 Skills: 2b, 3a, 3b, 4a, 4b, 4c.</b></p> <p>In Forces 3, pupils will write scientific sentences using the powerful language for the unit to explain scientific concepts. Pupils will use the RUULES to calculate moments of objects and create scientific diagrams to represent forces.</p> <p><b>Magnets 1</b> <b>KS3 Skills: 2a. 2b.</b></p> <p>In Magnets 1, pupils will learn how to draw scientific diagrams of magnetic fields and test hypotheses when investigating electromagnets.</p>	<p><b>Explore 2</b> <b>KS3 Skills: 2a, 3c.</b></p> <p>In Explore 2, pupils will develop their literacy to communicate the links between topics. Pupils will analyse data and use the RUULES to calculate pressure.,</p> <p><b>Particles 3</b> <b>KS3 Skills: 1b, 3c,3d,4a.</b></p> <p>Understand the development of scientific methods, theories and models based on new evidence, ideas and peer review.</p>	<p><b>Organisms 2</b> <b>KS3 Skills: 2a, 2f, 3e, 3f.</b></p> <p>Evaluate data, showing awareness of potential sources of random and systematic error.</p> <p>Identify further questions arising from their results.</p> <p><b>Explore 3</b> <b>KS3 Skills: 2a, 3c,3d.</b></p> <p>Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.</p>
<p><i>Why are we doing this now? How does this build on prior knowledge and the knowledge still to come?</i></p>	<p>Light 2 consolidates and builds on knowledge from Light 1 in Year 8. This is topic also begins to introduce types of Waves which is introduced in Waves 1 in HT3. The understanding of different properties of waves transitions into the topic of Waves and Energy in Physics at KS4 as well as Core practical (Waves in a liquid, Waves in a solid, Reflection and Refraction).</p> <p>Variation 3 extends on knowledge from Variation 1 and 2 where inheritance and variation are further developed into the understanding of evolution and natural selection. This topic is also explored further at KS4 in Biology.</p>	<p>Substance 3 builds from topics such as Particles, Substances and Reactions through Year 7 and 8. At GCSE students are expected to be familiar with the pH scale and different indicators of acidity and alkalinity.</p> <p>Earth 2 directly links with Substance 3 as students learn about chemical weathering due to acid rain. Students apply their knowledge or acidity to weathering of rocks.</p>	<p>Waves 1 builds from Light 1 (Year 8), Light 2 (Year 9) and Sound 1 (Year 7) where students will understand most properties and differences between light and sound waves. Waves 1 allows students to apply their knowledge of this and this also links directly with topics and required practical at GCSE in Physics.</p> <p>Health 2 builds further on Health 1 (Year 8) as well as Cells 1 (Year) in terms of reproduction. This unit also contributes to students own knowledge of sexual health and contraception. Knowledge of pathogens and how they spread are required for topics at GCSE such as Infection.</p>	<p>Forces 3 builds on Forces 1 (Year 7) and Forces 2 (Year 8) where pupils learnt about different types of forces and the affect that they have on causing objects to move. This prepares pupils to make links between forces and energy stores i.e. energy stored in a spring and leads onto GCSE Forces and Energy.</p> <p>Magnets 1 builds on KS2 materials and understanding of Forces 1 (Year 7) and Forces 2 (Year 8). Studying electromagnets builds on pupils understanding of Electricity 1 and 2 (Year 7 and 8). To deepen pupils understanding of magnets, pupils will develop understanding of the particles model from Particle 1 and 2 (Year 7 and 8). This all prepares pupils for making links between magnets and electricity in GCSE Magnet and electricity topics.</p>	<p>By studying Explore 2 pupils will make links between Forces and motion, variation, adaptation, evolution and Earth and space. Furthermore, Explore 2 will allow pupils to develop an appreciation of the natural world with links to scientific phenomena so they will be motivation to think of innovative ways to protect it in Explore 3.</p> <p>Particles 3 builds on knowledge from Particles 1 and 2 to link together the concept of atoms, elements and compounds to the periodic table and periodic trends. This knowledge is vital for forming the basis needed for most Chemistry units in KS4.</p>	<p>Organisms 2 builds on topics of Variation and Organisms 1 (Year 7). This topic develops students understanding of the importance of conservation and sustainability which are also key learning points at KS4.</p> <p>Explore 3 builds on Earth 2 as chemical and physical weathering link to the rock cycle. <b>Explore 3</b> which will introduce knowledge of how the Earth's materials can be used to make sustainable products.</p> <p>This will develop scientific skills of design, engineering and public speaking. This will build on knowledge from other STEM subjects and <b>Population Issues, Energy and Global fashion in Geography.</b> At KS4, students learn more about polymers and properties of polymers which is introduced in this topic.</p>

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